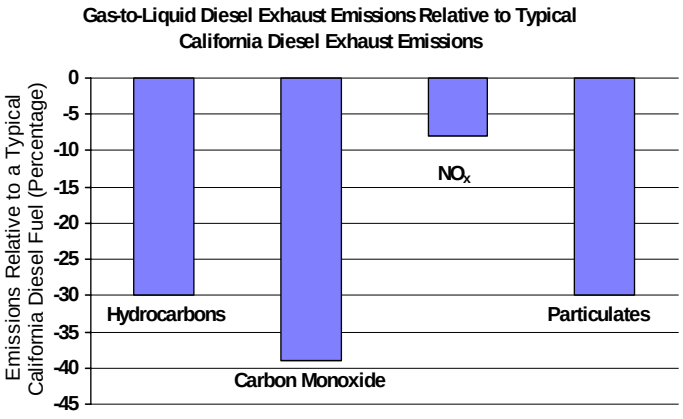
Gas-to-Liquid Fuels in Transportation

What is GTL?
Gas-to-Liquid (GTL) fuels can be produced from natural gas, coal, and biomass using a Fischer-Tropsch chemical reaction process. The liquids produced include naphtha, diesel, and chemical feedstocks.

GTL diesel can be used neat or blended with today's diesel fuel and used in existing diesel engines and infrastructure. These fuels provide an opportunity to reduce dependence on petroleum-based fuels and reduce tailpipe emissions.

GTL fuel has virtually no sulfur, aromatics, or toxics. It can be blended with non-complying diesel fuel to make the fuel cleaner so it will comply with new diesel fuel standards.

Unmodified diesel engines fueled with neat GTL show the following average emission reductions compared to typical California diesel.



GTL fuel offers a new opportunity to use non-petroleum-based fuels in diesel engines without increasing capital outlay or impacting infrastructure cost.

Furthermore, it could improve the prospects of new engines meeting the national 2007 and 2010 heavy-duty diesel engine emission standards.

Is there a fuel economy loss with GTL?
Due to the low density of neat GTL fuel, there may be a slight loss of fuel economy of up to 3.3 percent.

What are the economics of GTL?
The cost of producing GTL fuel has been declining as a result of better catalysts, larger plant size, and plant design; however, the cost to transport, distribute and market it are slightly higher than for locally produced refinery fuels. Research and development is focused on further reducing costs. Economies of scale from the new generation of plants under construction in Qatar will also reduce costs. With limited GTL fuel available for some years, GTL fuel will be sold in those markets that are prepared to pay higher costs.

Why produce GTL?
Natural gas is four times more expensive to transport than oil. Converting remote natural gas into a liquid reduces its cost. Declining GTL production costs, growing worldwide diesel demand, and stringent diesel exhaust emission standards and fuel specifications are driving the petroleum industry to revisit the GTL process to produce higher quality diesel fuels.

Currently, major oil companies are constructing GTL plants to produce fuel.

Aerial photo of the GTL plant at Escravos, Nigeria. Photo courtesy of Sasol Chevron

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Some remote natural gas can now be economically converted through the Fischer-Tropsch process into a clean diesel fuel. This fuel can be used as a blend stock to upgrade conventional petroleum diesel fuels and extend diesel fuel supplies.

Will GTL be produced in California?
The GTL process needs large volumes of low-cost natural gas, less than $1 per million BTUs (10 cents/therm), to compete with diesel fuel. Natural gas at this price, and in these volumes, does not currently exist in or near California.

GTL produced from pipeline-supplied natural gas would not be competitive (today's value is over $1.00/therm). In the long term, technology is expected to develop fuels that can be produced from nearby U.S. coal reserves, biomass, or waste.

Has GTL been used in California ?
In 2002, GTL fuel was used in Caltrans heavy-duty vehicles for one month. No fuel related performance or maintenance problems arose in this trial. In 2004,Yosemite water trucks used GTL fuel in a 12-month trial. The result was a significant reduction in vehicle emissions and no performance or maintenance problems.

GTL Availability
California's nearest GTL supplier is the Shell GTL plant at Bintulu, Malaysia. The plant, which began operation in 1993, was shutdown in December 1997 and restarted in May 2000. This plant can produce up to 4,000 barrels/day of GTL fuel for worldwide sales. This is equivalent to two percent of California's diesel demand.

Availability of GTL fuel will continue to be limited, as fuel from the planned large Qatar plant will be spread across world markets. In the near-term, GTL fuel can be blended with conventional diesel to reduce existing diesel vehicle exhaust and toxic emissions.

Construction at Oryx (Qatar) GTL Plant.
Photo courtesy of Sasol Chevron

Where can I go for more information?
To find out more, perform a website search using the following terms: Fischer-Tropsch Diesel, Biomass-to-Liquids, Synthetic Diesel, Shell GTL, Shell Middle Distillate Synthesis (SMDS), Sasol, Sasol Chevron, Exxon, and ConocoPhillips.

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